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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/637,766	08/11/2000	Sergey Lamansky	10020/20701	7827

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AS 11

Office Action Summary

Application No.

09/637,766

Applicant(s)

LAMANSKY ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/28/02, 07/22/02 & 09/24/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-8 and 10-12 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7, 10. 6) ☐ Other:

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1. This Office action is in response to applicants' amendment received 07/22/02 (Paper No. 9), which provides substitute specification pages 2-12, cancels claims 1-3 and adds claims 4-12.

Claims 4-12 are pending.

2. Claims 4, 6-8 and 10-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of a "heavy" metal as required by claims 4, 6-8 and 10-12 is not clear. (Claim 12 is included here because it is not clear if claim 12 is limited to compounds of the seven specific formulae set forth in the claim. If not, claim 12 encompasses compounds comprising a generic "heavy metal".)

Claims 7 and 8: The term "strong" is relative. Insufficient guidance is provided in the specification to determine the scope of a "strong" electron-withdrawing character.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of

the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 12 recites the broad recitation "organometallic compound comprising: a heavy metal, a single carbon-coordination ligand...and at least one non-carbon coordination ligand bound to the heavy metal", and the claim also recites that the organometallic compound "has a chemical structure represented by a formula selected from the group consisting of" followed by seven specific formulae which is the narrower statement of the range/limitation. It is not clear if the compound of claim 12 must be represented by one of the seven specific formulae, or if claim 12 encompasses all organometallic compounds within the scope of the broad recitation.

3. With respect to the scope of a "heavy" metal, in the remarks accompanying applicants' amendment, the statement is made that "heavy metal" is defined in the specification as a metal having an atomic number of at least 72 (lines 20-21 of substitute page 3). The examiner notes that this portion of the specification does not explicitly state that "heavy" metals are those metals having an atomic number of at least 72. Rather, this portion of the specification teaches that heavy metals having an atomic number of at least 72 are preferred metals for the present proposed invention. In *Grant & Hackh's Chemical Dictionary*, 5th ed. (1987 by McGraw-Hill, Inc.), a heavy metal is defined as a metal of specific gravity greater than 4. In *Concise Chemical and Technical Dictionary*, 4th ed. (1986 by Chemical Publishing Co., Inc.), a heavy metal is defined as a metal of atomic weight greater than sodium. Given the varying definitions of heavy

metal, and the disclosure of heavy metals having an atomic number of at least 72 as preferred metals, it is not clear that the claim recitation of "heavy metal" would necessarily be recognized as limiting the metal to a metal having an atomic number of at least 72.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Gaetano DiMarco et al. in *Anal. Chem* 70 (23), pp. 5019-5023.

The first iridium complex shown in Chart 1 on page 5020 meets the limitations of the organometallic compound required by present claims 4 and 5. The prior art teaches that the complex immobilized in a polymeric matrix exhibits an intense luminescence spectra. See Figure 1 and the first paragraph of the "RESULTS".

The only positive limitation of the presently claimed light emitting device is an emissive layer comprising the organometallic compound. The prior art disclosure of the iridium complex immobilized in a polymeric matrix anticipates an emissive layer comprising the organometallic compound.

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6. Claims 4-6 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Maestri et al. ("Photochemistry and Luminescence of Cyclometallated Complexes", 1992).

Maestri et al. disclose various organometallic complexes meeting the limitations of the organometallic compound required by present claims 4-6 and 10.

$\text{Ir}(\text{bpy})_2(\text{bpy}-\text{C}^3)^{2+}$ and $\text{Ir}(\text{ppy})(\text{bpy})_2^{2+}$ which are disclosed, for example, in the paragraph bridging pages 12-13 meet the limitations of the organometallic compound required by present claims 4 and 5. $\text{Ir}(\text{ppy})(\text{bpy})_2^{2+}$ further meets the limitations of the organometallic compound required by present claim 10. Both of these complexes exhibit luminescence in a rigid matrix at 77 K as taught, e.g., on pages 35-36.

$\text{Ru}(\text{bpy})_2(\text{nppy})^+$ which is disclosed, for example, in Table 2 on page 28, meets the limitations of the organometallic compound required by present claims 4 and 6 unless "heavy metal" is limited to metals having an atomic number of at least 72. This complex exhibits luminescence in a rigid matrix at 77 K as taught, e.g., on pages 25-26.

The only positive limitation of the presently claimed light emitting device is an emissive layer comprising the organometallic compound. The disclosure of a complex in a rigid matrix exhibiting luminescence anticipates an emissive layer comprising an organometallic compound.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maestri et al. as applied to claims 4-6 and 10 above and for the further reasons set forth below.

In the event that the requirement for a "heavy" metal requires a metal having an atomic number of at least 72, Maestri et al. do not give any specific examples of a complex meeting the limitations of the organometallic compound required by present claim 6. However, one of ordinary skill in the art would have been motivated to make complexes other than those specifically disclosed by Maestri et al. utilizing the ligands disclosed on pages 3-4 of the prior art. One of ordinary skill in the art would have been motivated to make other complexes so as to provide light emitting materials other than those specifically disclosed by the prior art. One of ordinary skill in the art at the time of the invention, having knowledge of the prior art teachings on pages 25-26 regarding the effect of a nitro substituent on a ppy ligand, would have reasonably expected that substituting nppy for ppy in $\text{Ir(ppy)(bpy)}_2^{2+}$ would provide a complex that exhibits luminescence similar to that exhibited by $\text{Ir(ppy)(bpy)}_2^{2+}$.

9. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 12 would be allowable if clearly limited only to an organometallic compound represented by a formula selected from one of the seven formulae shown in the claim.

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10. With respect to applicants' remarks regarding the combination of Forrest et al. in view of Maestri et al., the examiner does not agree that some of the present claims are patentable over these two references in combination. However, since the present claims, unlike original claims 1-3, do not require that the device be a device for producing "electroluminescence", the rejections set forth in this Office action are considered to be better than a rejection based on Forrest et al. in view of Maestri et al.

11. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY
10/21/02



MARIE YAMNITZKY
PRIMARY EXAMINER

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